

# The Snowmass Process\*

Kate Scholberg, Duke University  
Snowmass Early Career General Meeting

*(Many slides stolen from Young Kee Kim's HEPAP presentation)*



\*Name is historical! Originally held in Snowmass, Colorado

“Snowmass” is the **long-term planning exercise** for the **particle physics community**

Its goal is to develop the **community’s long-term physics *aspirations***.

Its narrative will communicate the opportunities for discovery in particle physics to the broader scientific community and to the government funding agencies

It’s Part I of a several-year strategic planning process

... Part II is

“P5”: Particle Physics Project Prioritization Panel.

P5 is charged by the US **agencies** and involves ***prioritization* given funding constraints**

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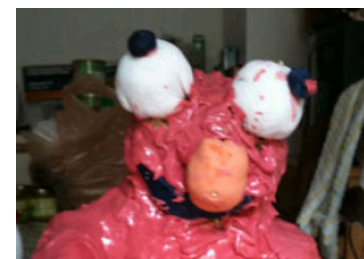


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# U.S. Strategic Planning Process for Particle Physics

~year-long process

Snowmass Community-Wide “Science” Study

Organized by Division of Particles and Fields (DPF) of APS



Input to P5

~year-long process

P5 (Particle Physics Project **Prioritization** Panel)

formulate a 10-year execution plan (20 year vision) within funding constraints

Subpanel of HEPAP, High Energy Physics Advisory Panel for DOE/NSF funding agencies

Particle Physics is not isolated:

Long-Range Plan for Nuclear Science (neutrinos, fundamental symmetry, QCD, ...)

Decadal Survey on Astronomy and Astrophysics (dark energy, CMB, dark matter, ...)

HEPAP Accelerator R&D Subpanel Report

...



# Comments

Snowmass doesn't prioritize explicitly, and doesn't need to explicitly take into account funding constraints...

## HOWEVER:

- There is **implicit prioritization by emphasis**.
  - Topics/projects/ideas for which there is clear enthusiasm in the community will have higher weighting in P5's consideration ...and general consensus as to directions can be powerful
- Proposals that require unrealistically large resources will be necessarily disfavored by P5

## ALSO:

Although timescale of Snowmass+P5 strategic planning is 1-2 decades out, there is room for longer-term thinking and blue-sky ideas in Snowmass.

Not everything discussed needs to be for <20-year timescale!

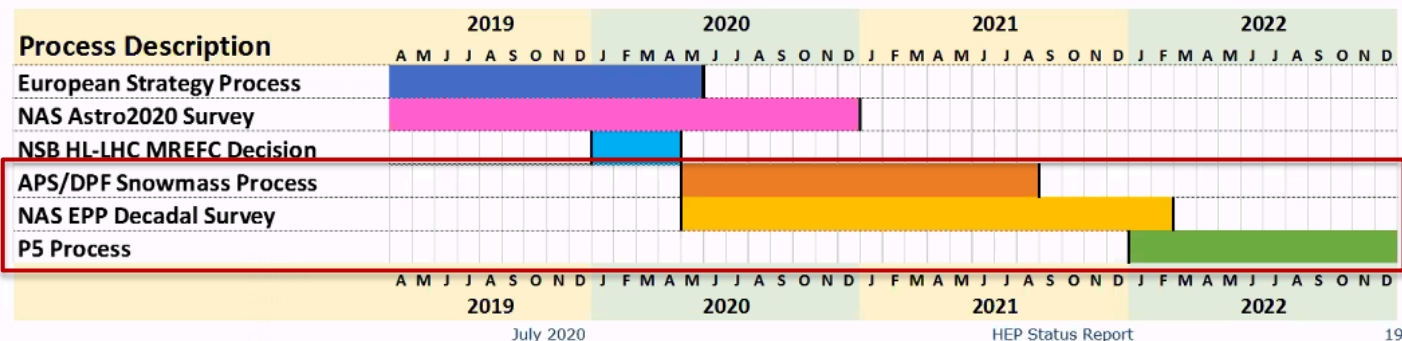


# Timeline

Jim Siegrist's presentation (2020-07-09)

## Strategic Planning Timeline

- ▶ To provide timely input to the FY25 budget formulation, the next P5 report will be required by March 2023
- ▶ U.S. Community Snowmass process is underway with major meeting occurring in summer 2021
- ▶ Potential timeline for the next NAS EPP Decadal Survey could be mid-2020 through early-2022
  - ▶ Overlap with Snowmass could enable synergy with Snowmass processes and delivery of report as P5 process begins



- Snowmass 2021
- NAS EPP 2022
- P5 2023

# Particle Physics is Global

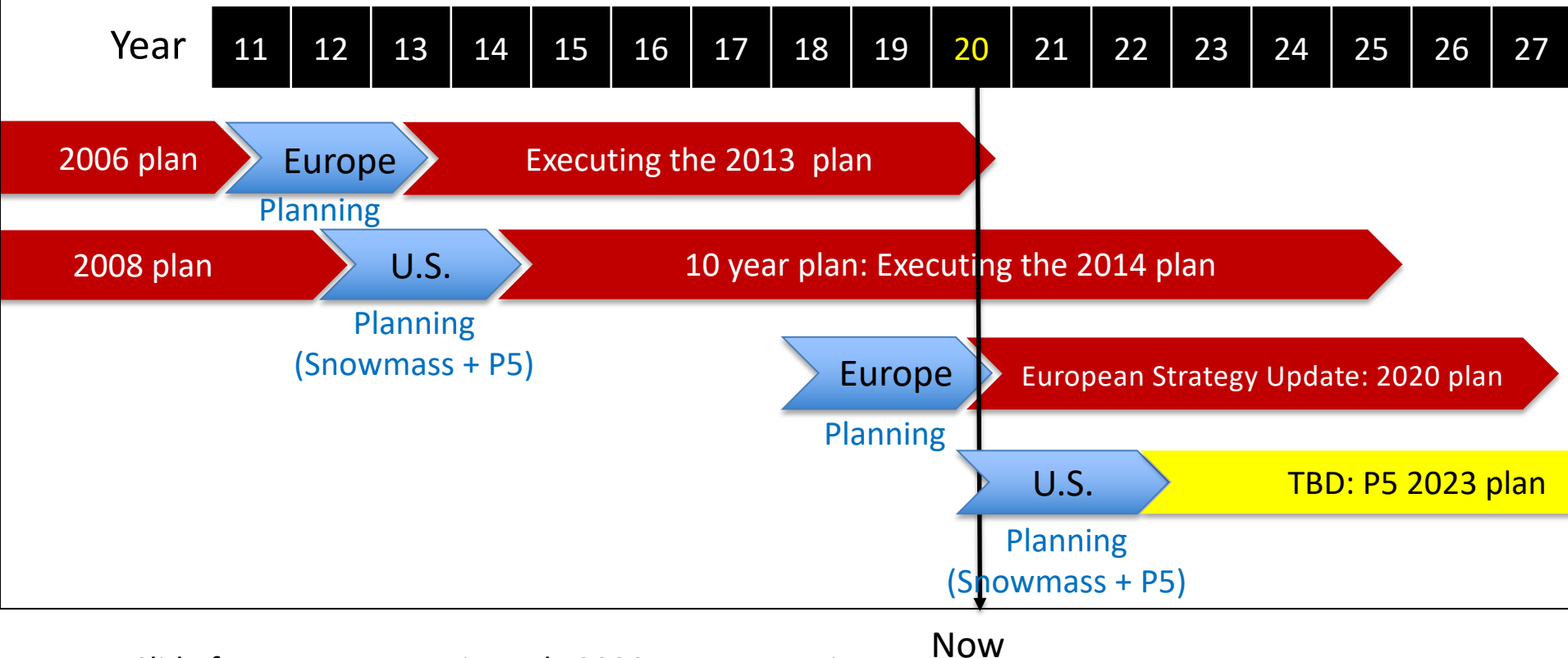
## Europe and U.S.

- Frequency: 7 years (Europe), ~8 years (U.S.)
- Process: ~2 years in total (~1 year on science by the community + ~1 year priorities)

Snowmass (U.S.)

P5 (U.S.)

Asia, Canada, Latin America, ...



Slide from Young-Kee Kim, July 2020 HEPAP meeting

# Snowmass Topics led to P5 Science Drivers

## Snowmass 2013 Report

- Frontiers
  - Energy Frontier
  - Intensity Frontier
  - Cosmic Frontier
- Cross-Cutting
  - Facilities (Underground and Accelerator)
  - Instrumentation
  - Computing
  - Theory
  - Communication

## P5 2014 Report

**Five intertwined scientific Drivers** were distilled from the results of a yearlong community-wide study:

- Use the Higgs boson as a new tool for discovery
- Pursue the physics associated with neutrino mass
- Identify the new physics of dark matter
- Understand cosmic acceleration: dark energy and inflation
- Explore the unknown: new particles, interactions, and physical principles

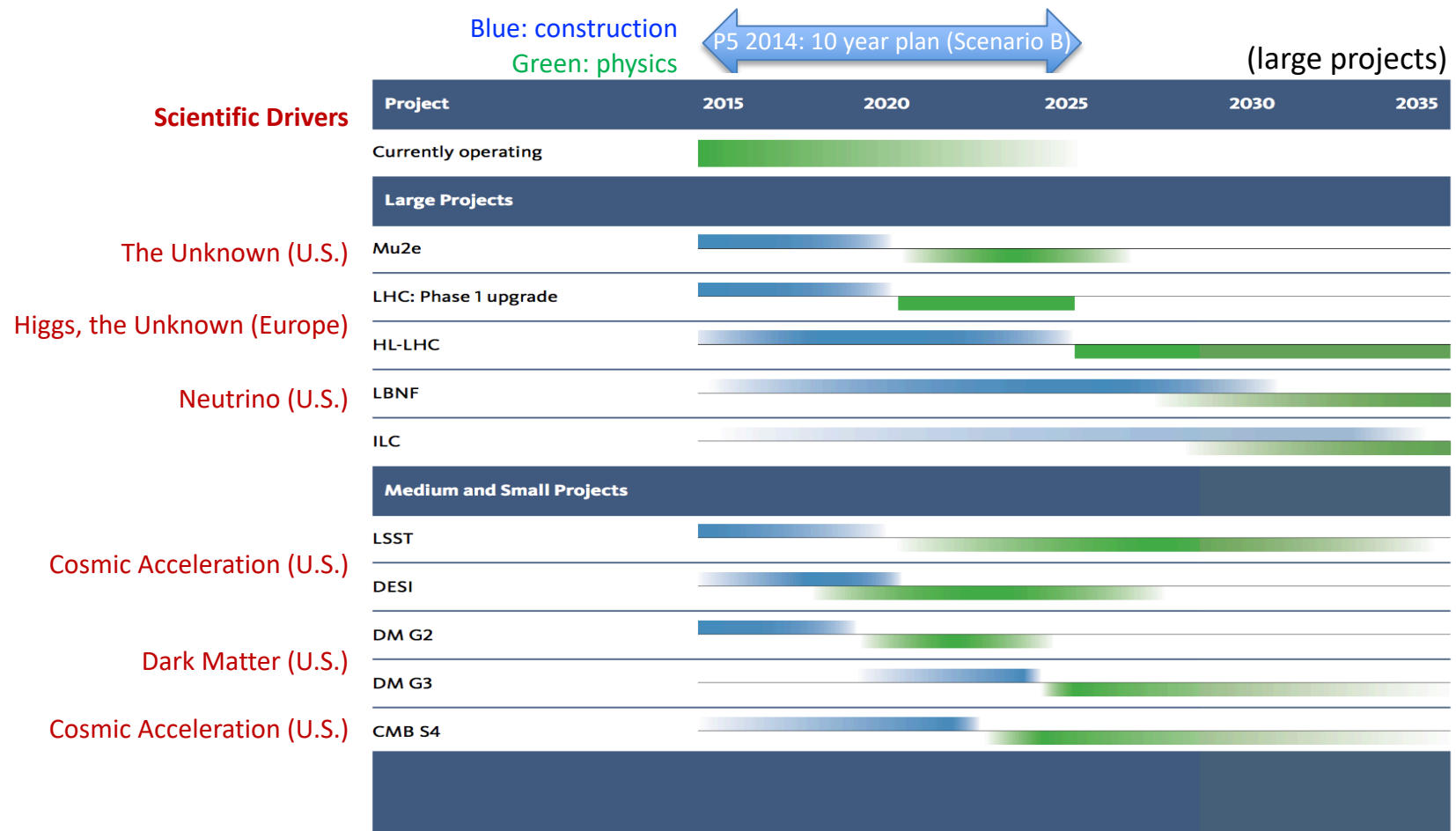


**29 recommendations !!**

# Snowmass 2013 + P5 2014 has been very successful !!

## P5 2014 Report

- Support a program of projects of all scales (large, medium, small), new ideas & developments
- Accelerator science / R&D, instrumentation R&D, computing / software; next gen. education and training



**FIGURE 1** Approximate construction (blue; above line) and expected physics (green; below line) profiles for the recommended major projects, grouped by size (Large [ $> \$200M$ ] in the upper section, Medium and Small [ $\leq \$200M$ ] in the lower section), shown for Scenario B. The LHC: Phase 1 upgrade is a Medium project, but shown next to the HL-LHC for context. The figure does not show the suite of small experiments that will be built and produce new results regularly.

# Snowmass 2021

- Successful Snowmass 2013 is our guide!
  - Implement lessons learned from Snowmass 2013
- Snowmass 2021: Ten Frontiers
  - Energy Frontier
  - Frontiers in Neutrino Physics
  - Frontiers in Rare Processes & Precision Measurements
  - Cosmic Frontier
  - Theory Frontier
  - Underground Facilities and Infrastructure Frontier
  - Accelerator Frontier
  - Instrumentation Frontier
  - Computational Frontier
  - Community Engagement Frontier

# Create a transparent and inclusive process

- DPF Executive Committee + DPF Program Committee + DAP, DNP, DPB, DGRAV representatives
  - Initial organization work
  - Scope of each Frontier + first draft of subgroups of each Frontier
  - Facilitate convener nominations
- General call for frontier & topical convener nominations
  - Closed November 15, 2019
  - Self-nominated, by peer, or by a small group
- Frontier co-conveners
  - Chosen by elected representatives (DPF EC + Chair-line of DAP, DNP, DPB, DGRAV)
  - Based on balance: senior/junior; theory/experiment; gender; region; labs/univ.s
  - ~3 co-conveners for each of the 10 Frontiers
- Topical groups and topical group conveners
  - 6-10 topical groups for each frontier: 78 topical groups in total
  - ~3 co-conveners for each topical group: topical group conveners from all the compiled nominations + others (e.g. international members), endorsed by the Steering Group
- Engaged DAP, DNP, DPB, DGRAV in the process from the beginning



# Input to Snowmass

## Letters of Interest

short, and short term, for conveners to plan

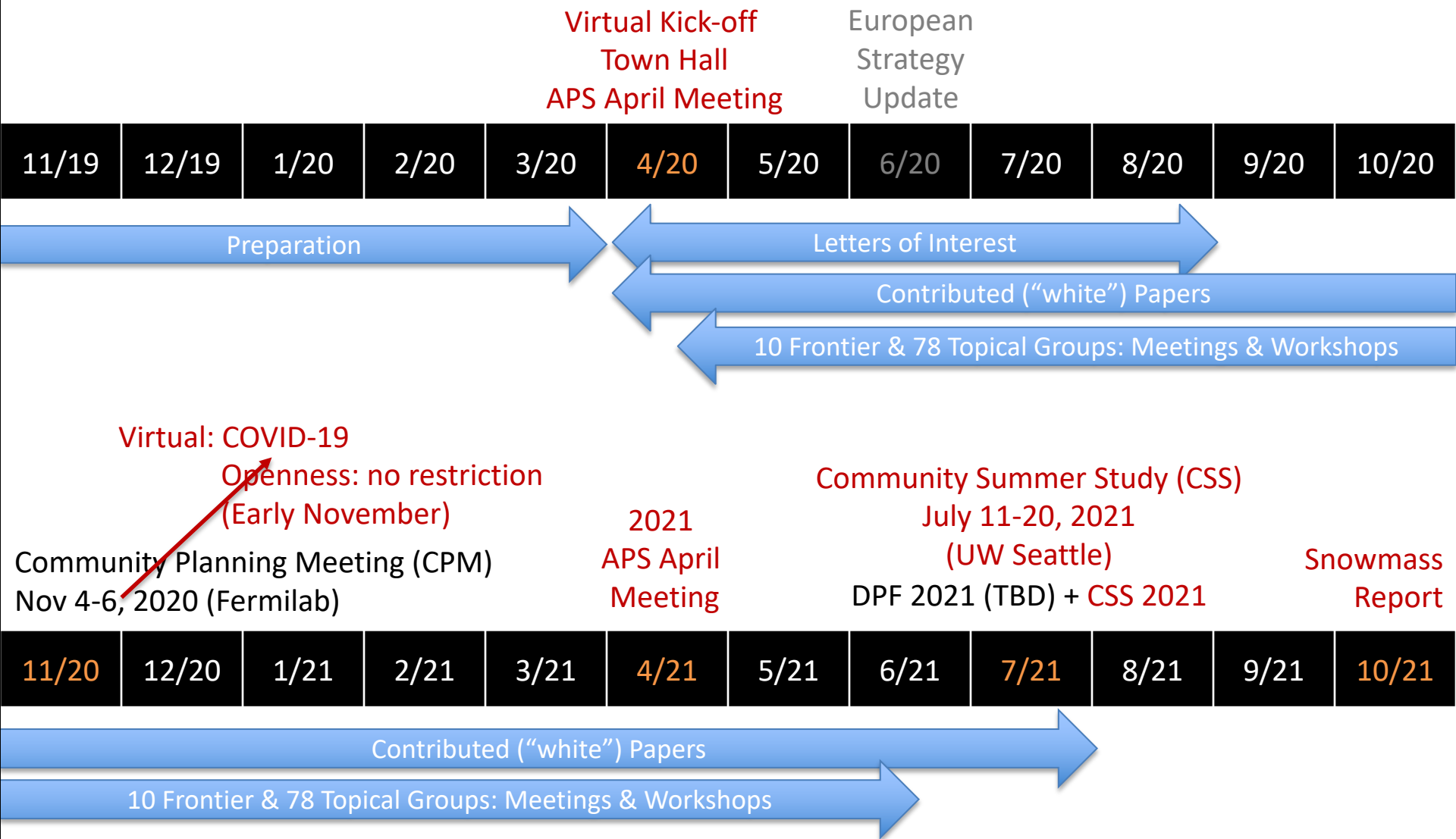
- Two-pagers
- Due August 31, 2020
- Can be “concept” or “proposed project”
- **Purpose is for topical group conveners to use for planning activities**
- Can submit to multiple Frontiers or topical groups  
(we’ll make sure they get to the right places)
- Not required in order to submit a contribution
- Submit here: <https://snowmass21.org/loi>

## Contributions

the main Snowmass content

- Any length (but “executive summary” recommended for long ones)
- Final versions due July 31, 2021
- Can be “concept” or “proposed project”; need not correspond to LOI
- Submit to arXiv first
- **Will be part of the overall Snowmass output**
- Submission instructions: <https://snowmass21.org/submissions/start>

# Snowmass Timeline



# Community-Wide Meetings & Workshops

- 2020 APS April Meeting
  - Snowmass Kick-off meeting: Town Hall
- Community Planning Meeting (CPM 2020)
  - Early ~~November~~, **October** -2020, virtual
  - Local Organizing Committee
  - Program Committee in progress
    - ✓ 10 members: 1 from each Frontier
      - 2 early careers
      - ~4 with overall and global views
- 2021 APS April Meeting
  - Mid-term evaluation (to be determined)
- Community Summer Study (CSS 2021)
  - July 11-20, 2021 at UW Seattle
  - Local Organizing Committee
  - Exploring DPF 2021 + CSS 2021 option (to be determined)
    - DPF 2021: ~3 days primarily talks by early careers on current results
    - ~1 day break
    - Snowmass CSS: 9-10 days

## CPM Local Organizing Committee

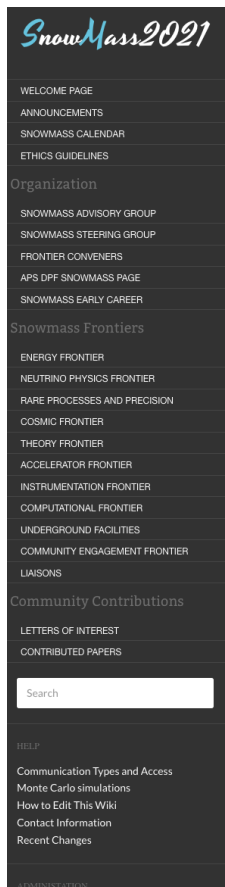
Jonathan Asaadi	U. Texas, Arlington
Sapta Bhattacharya	Northwestern U.
Zoltan Gecse	Fermilab
Shih-Chieh Hsu	U. Washington, Seattle
<b>Bo Jayatilaka, co-chair</b>	<b>Fermilab</b>
<b>Brendan Kiburg, co-chair</b>	<b>Fermilab</b>
Erica Snider	Fermilab
Tiziana Spina	Fermilab
Gordon Watts	U. Washington
Yuanyuan Zhang	Fermilab

## CSS Local Organizing Committee

Alvaro Chavarria	U. Washington, Seattle
Jason Detwiler	U. Washington, Seattle
Anna Goussiou	U. Washington, Seattle
Alejandro Garcia	U. Washington, Seattle
<b>Shih-Chieh Hsu, co-chair</b>	<b>U. Washington, Seattle</b>
Seyda Ipek	UC Irvine
Laura Jeanty	U.. Oregon
Joey Key	U. Washington, Seattle
Tongyan Lin	UC San Diego
Henry Lubatti	U. Washington, Seattle
Elise Novitski	U. Washington, Seattle
Gray Rybka	U. Washington, Seattle
Jan Strube	PNNL
Lauren Tompkins	Stanford U.
<b>Gordon Watts, co-chair</b>	<b>U. Washington, Seattle</b>
Tien-tien Yu	U.. Oregon

# Communication to the community

- Snowmass Wiki (<https://snowmass21.org/>)
  - One-stop shop
  - Technical liaison: Sergei Chekanov, ANL



## Welcome to Snowmass 2021

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The Particle Physics Community Planning Exercise (a.k.a. "Snowmass") is organized by the Division of Particles and Fields (DPF) of the American Physical Society. Snowmass is a scientific study. It provides an opportunity for the entire particle physics community to come together to identify and document a scientific vision for the future of particle physics in the U.S. and its international partners. The P5 (Particle Physics Project Prioritization Panel) will take the scientific input from Snowmass and develop a strategic plan for U.S. particle physics that can be executed over a 10 year timescale, in the context of a 20-year global vision for the field.

We aim for everyone's voice to be heard. Your contributions and participation are critical for the success of Snowmass and they will naturally occur as part of one or more working groups directed by the conveners. There will be various Town Hall meetings for us to communicate with you and to receive your feedback. You are also welcome to provide input and suggestions on the Slack channel (<https://snowmass2021.slack.com/>). This Snowmass wiki provides news and announcements and has pages dedicated to each frontier. If you are an early career scientist, we encourage you to join the "Snowmass Young" mailing list ([snowmass-young@fnal.gov](mailto:snowmass-young@fnal.gov)) by emailing to [listserv@listserv.fnal.gov](mailto:listserv@listserv.fnal.gov) with the body of the message "Subscribe snowmass-young YOUR NAME". Agendas and presentations of all Snowmass-related meetings are available via this [Snowmass Indico link](#).

Sincerely,

Young-Kee Kim (DPF Chair), Tao Han (DPF Chair-Elect), Joel Butler (DPF Vice-Chair), Priscilla Cushman (DPF Past Chair)

[Edit](#)

## DPF Community Planning Process

Various workshops will be organized by Frontier Conveners between the 2020 Snowmass Planning Meeting (most likely a virtual meeting on Nov. 4 - 6, 2020) and the 2021 Snowmass Summer Study (July 11 - 20, 2021 at UW Seattle). Workshop locations will be chosen to maximize "inclusiveness" based on accessibility and economic consideration. For all the meetings and workshops, we will make sure that we are inclusive to those who participate remotely and we will have a special session to discuss APS efforts for openness and the importance of open international collaboration.

[Edit](#)

## News Highlight

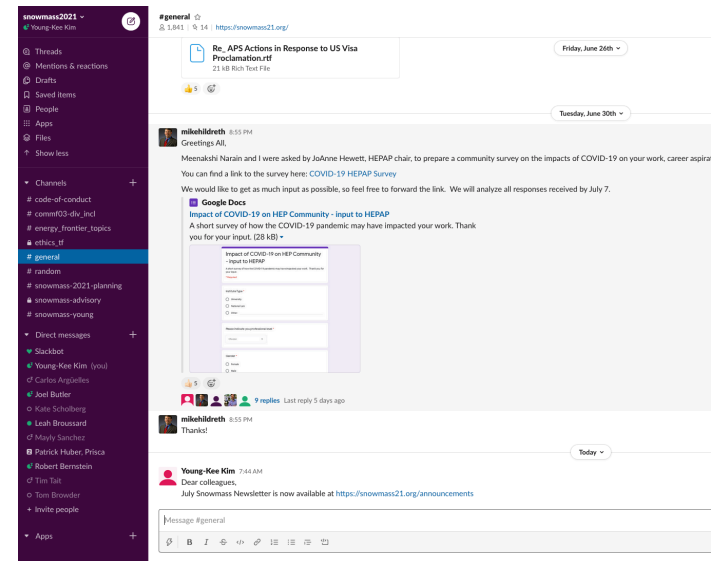
see [Announcements](#) tab on the sidebar for a complete list

### News Highlight: Information and Upcoming Events

- European Strategy Update for Particle Physics: [Recommendations, Deliberation document](#)
- [DPF Statement on Police Violence and Supporting Black Communities](#)
- [Monthly Snowmass Newsletter \(July 2020\)](#)
- Presentations and recording of virtual Town Hall (April 18): <https://indico.fnal.gov/event/23601/>
- [Letters of Interest \(April 1 - August 31, 2020\) - https://snowmass21.org/loi](#)
- [Contributed Papers \(April 1 - July 31, 2021\) - https://snowmass21.org/submissions/](#)

- Snowmass email
  - [snowmass@fnal.gov](mailto:snowmass@fnal.gov)
  - [snowmass-young@fnal.gov](mailto:snowmass-young@fnal.gov)
  - Frontier & Topical group mailing lists

- Slack Channels



- Monthly Snowmass Newsletter

# Monthly Snowmass Newsletter

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## Monthly Snowmass Newsletter

June 2020

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Organization and activities of S direct you to various pages incl frontier pages with organization groups, and [core principles ar](#) encourage community member and to submit [Letters-of-Intere:](#)

### Energy Frontier

The Energy Frontier is organize Standard Model physics. Conve place. The topical groups have communication channels. A vir The meeting focused on phys contributions, as well as overall introductory presentation from

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## Monthly Snowmass Newsletter

July 2020

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Organization and activities of Snowmass 2021 are available on the [Snowmass wiki page](#). This page will direct you to various pages including the [calendar page](#) with schedules of workshops and meetings, the frontier pages with organization, activities, listserv mailing lists and Slack channels of frontier and topical groups, and [core principles and community guidelines](#) developed by the DPF Ethics Task Force. We encourage community members to participate in discussions on Slack frontier or topical group channels and to submit [Letters-of-Interest \(LOIs\)](#) and [Contributed Papers](#).

The [Snowmass Steering Group](#) meets weekly and the [Snowmass Advisory Group](#) meets once every four weeks. In addition, the Snowmass Advisory Group, all Frontier Conveners and co-chairs of the Community Planning Meeting (CPM) and the Community Summer Study (CSS) meet once every four weeks.

### Snowmass Community Planning Meeting

The CMP 2020 will be a virtual meeting and be open to everyone. The local organizing committee has been formed, and the program committee is being formed. The CMP 2020 will take place early November 2020. A draft agenda with dates will be produced in the next few weeks.

### Snowmass Early Career

We had over 250 nominations come in for Snowmass early career leadership! We have reached out to all of the early career leadership nominees and defined the structure, key initiatives, and key tasks for each initiative based on feedback from the early career community and the nominees. Nominees have accepted their nominations in their areas of interest and are beginning to meet and decide on leadership

# Snowmass Advisory Group

- DPF Executive Committee

- Chair: Young-Kee Kim
- Chair-Elect: Tao Han
- Vice Chair: Joel Butler
- Past Chair: Prisca Cushman

## Steering Group

- Secretary/Treasurer: Mirjam Cvetič
- Councilor: Elizabeth Simmons
- Member-at-Large: Rick Van Kooten
- Member-at-Large: Elizabeth Worcester
- Member-at-Large: Natalia Toro
- Member-at-Large: Andre de Gouvea
- Member-at-Large: Mary Bishai
- Member-at-Large: Lauren Tompkins
- Early Career Member-at-Large: Sara Simon

- Editor and Communication

- Editor – Michael Peskin
- Communication – Bob Bernstein

- Representatives from other Divisions

- DPB: Sergei Nagaitsev
- DNP: Yury Kolomensky
- DAP: Glennys Farrar
- DGRAV: Gabriela Gonzales

- Representatives from the Int. Community

- Africa / Middle East
  - Azwinndini Muronga, Nelson Mandela Metropolitan Univ, South Africa
- Asia / Pacific
  - Atsuko Ichikawa, Kyoto University, Japan
  - Xinchou Lou, IHEP, China
- Canada
  - Heather Logan, Carleton University, Canada
- Europe / Russia
  - Val Gibson, Cavendish Laboratory, UK
  - Berrie Giebels, CNRS, France
- Latin America
  - Claudio Dib, Universidad Tecnica Federico Santa Maria, Chile

Steering group meets weekly; Advisory group meets once every 4 weeks;

All Frontier conveners + Advisory group + CPM/CSS LOC co-chairs meet once every 4 weeks

Monitoring the progress to make sure that all is moving forward smoothly to achieve the goals of the planning exercise

# Snowmass Coordination Team

27 Advisory Group members (including 8 Steering Group members)

30 Conveners for 10 Frontier Groups

> 200 Conveners for 78 Topical Groups

“many” (TBD) representatives of Early Careers

26 LOC members for 2020 Planning Meeting and 2021 Summer Study

42 liaisons for cross-cutting areas between Frontier Groups and Topical Groups

	Neutrino Physics	Rare & Precision	Cosmic Frontier	Theory Frontier	Accelerator Frontier	Instrumentation Frontier	Computational Frontier	Underground Facilities & Infras	Community Engagement Frontier
Energy Frontier	Andre de Gouvea	Angelo di Canto	Caterina Doglioni	Laura Reina	Dmitri Denisov Meenakshi Narain	Maksym Titov Caterina Vernieri	Daniel Elvira		Daniel Whiteson Sergei Gleyzer
Neutrino Physics		Bob Bernstein	Tali Figueroa-Feliciano Yvonne Wong	Irina Mocioiu K.S. Babu	Laura Fields	Mayly Sanchez	Alex Himmel	Albert de Roeck	Sowjanya Gollapinni
Rare & Precision			TBD	Alexey Petrov	Bob Bernstein	Marina Artuso	Stefan Meinel	TBD	Sophie Middleton
Cosmic Frontier				Flip Tanedo		Kent Irwin Hugh Lippincott	Deborah Bard Brian Yaney	Hugh Lippincott Jody Cooley	Sijbrand de Yong
Theory Frontier					LianTao Wang		Steven Gottlieb		Devin Walker
Accelerator Frontier						Andy White	Jean-Luc Vay		TBD
Instrumentation Frontier							Darin Acosta	Maurice Garcia-Sciveres, Eric Dahl	Farah Rahim
Computational Frontier									David Bruhwiler
Underground Facilities & Infrastructure									TBD

New topical groups and liaisons will be added if needed





## Advice to Early Career People for Snowmass....

- You all are already doing an impressive job organizing and "in-reaching"! ...
- Consider joining APS DPF+other divisions you are interested in, if you are already a member (APS resources  $\propto$  membership)
- Get involved in LOIs/contributions, workshops, Slack. In some Frontiers and topical groups there will be technical studies to contribute to.
- Don't be shy about asking conveners to include SEC member input.
- Don't forget that particle physics is international. Reach out to international early career colleagues.
- Particle physics has broader opportunities for connections and mentorship than many science subfields. Engage with your collaborations, working groups, etc.
- Community Engagement Frontier is important no matter what other Frontiers you are involved in.

# Where to Find Information

Links to everything: **snowmass21.org**

Slack: snowmass2021.slack.com

You all will be the long-term beneficiaries of this process...

**Please engage!**  
**Please keep on engaging!**

Backups: Frontier convener info from YKK HEPAP slides

# Energy Frontier



Meenakshi Narain (Brown U)



Laura Reina (FSU)



Alessandro Tricoli (BNL)

Topical Group			Topical Group co-Conveners		
EF01	EW Physics	Higgs Boson properties and couplings	Sally Dawson (BNL)	Andrey Korytov (U Florida)	Caterina Vernieri (SLAC)
EF02		Higgs Boson as a portal to new physics	Patrick Meade (Stony Brook)	Isobel Ojalvo (Princeton)	
EF03		Heavy flavor and top quark physics	Reinhard Schwienhorst (MSU)	Doreen Wackerroth (Buffalo)	
EF04		EW Precision Phys. & constraining new phys.	Alberto Belloni (Maryland)	Ayres Freitas (Pittsburgh)	Junping Tian (Tokyo)
EF05	QCD and Strong Interactions	Precision QCD	Michael Begel (BNL)	Stefan Hoeche (FNAL)	Michael Schmitt (NW)
EF06		Hadronic structure and forward QCD	Huey-Wen Lin (MSU)	Pavel Nadolsky (SMU)	Christophe Royon (Kansas)
EF07		Heavy Ions	Yen-Jie Lee (MIT)	Swagato Mukherjee (BNL)	
EF08	BSM	Model specific explorations	Jim Hirschauer (FNAL)	Elliott Lipeles (UPenn)	Nausheen Shah (Wayne State)
EF09		More general explorations	Tulika Bose (UW-Madison)	Zhen Liu (Maryland)	Simone Griso (LBL)
EF10		Dark Matter at colliders	Caterina Doglioni (Lund)	LianTao Wang (Chicago)	

# Frontiers in Neutrino Physics



Patrick Huber (Virginia Tech)



Kate Scholberg (Duke University)



Elizabeth Worcester (BNL)

Topical Group		Topical Group co-Conveners			
NF01	Neutrino Oscillations	Peter Denton (BNL)	Megan Friend (KEK)	Mark Messier (Indiana)	Hiro Tanaka (SLAC)
NF02	Sterile Neutrinos	Georgia Karagiorgi (Columbia)	Bryce Littlejohn (IIT)	Pedro Machado (Fermilab)	Alex Sousa (Cincinnati)
NF03	Beyond the SM	Pilar Coloma (Valencia)	Lisa Koerner (U.Houston)	Ian Shoemaker (Virginia Tech)	Jae Yu (UT Arlington)
NF04	Neutrinos from Natural Sources	Yusuke Koshio (Okayama)	Gabriel Orebi Gann (UCB/LBNL)	Erin O'Sullivan (Uppsala)	Irene Tamborra (NBIA)
NF05	Neutrino Properties	Carlo Giunti (Torino)	Ben Jones (UT Arlington)	Lisa Kaufman (SLAC)	Diana Parno (CMU)
NF06	Neutrino Cross Sections	Jonathan Asaadi (UT Arlington)	Baha Balantekin (U.Wisconsin)	Kendall Mahn (MSU)	Jason Newby (ORNL)
NF07	Nuclear Safeguards and Other Applications	Nathaniel Bowden (LLNL)	Jon Link (Virginia Tech)	Wei Wang (Sun-Yat Sen U.)	
NF08	Theory of Neutrino Physics	André de Gouvêa (NW)	Irina Mocioiu (Penn State)	Saori Pastore (Washington U.)	Louis Strigari (TAMU)
NF09	Artificial Neutrino Sources	Laura Fields (FNAL)	Alysia Marino (U.Colorado, Boulder)	Pedro Ochoa (UCI)	Josh Spitz (U.Michigan)
NF10	Neutrino Detectors	Josh Klein (U.Penn)	Ana Machado (UNICAMP)	Dave Schmitz (U.Chicago)	Raimund Strauss (TUM)

# Frontier of Rare Processes & Precision Measurements



Marina Artuso (Syracuse U.)



Alexey Petrov (Wayne State U.)



Bob Bernstein (FNAL)

Topical Group		Topical Group co-Conveners	
RF01	Weak Decays of b and c	Angelo di Canto (BNL)	Stefan Meinel (U. Arizona)
RF02	Strange and Light Quarks	Emilie Passemar (Indiana)	Evgueni Goudovski (Birmingham)
RF03	Fundamental Physics and Small Experiments	Tom Blum (Connecticut)	Peter Winter (ANL)
RF04	Baryon and Lepton Number Violation	Pavel Fileviez Perez (Case Western Reserve U.)	Andrea Pocar (U. Mass, Amherst)
RF05	Charged Lepton Flavor Violation	Sacha Davidson (Lyon)	Bertrand Echenard (Caltech)
RF06	Dark Sector at Low Energies	Stefania Gori (UCSC)	Mike Williams (MIT)

# Cosmic Frontier



Aaron Chou (Fermilab)



Marcelle Soares-Santos (Brandeis)



Tim Tait (UC Irvine)

Topical Group		Topical Group co-Conveners			
CF01	Particle DM	Jodi Cooley (SMU)	Tongyan Lin (UCSD)	Hugh Lippincott (UCSB)	Tracy Slatyer (MIT)
CF02	Wavelike DM	Joerg Jaeckel (Heidelberg)	Gray Rybka (UW)	Lindley Winslow (MIT)	
CF03	DM Astro Probes	Alex Drlica-Wagner (FNAL)	Chanda Prescod-Weinstein (NH)	Haibo Yu (Riverside)	
CF04	DE & CA The Modern Universe	Jeff Newman (Pittsburgh)	Masao Sako (Penn)	Anze Slosar (BNL)	
CF05	DE & CA Cosmic Dawn & Before	Clarence Chang (ANL)	Laura Newburgh (Yale)	Deirdre Shoemaker (Georgia Tech.)	
CF06	Dark Energy complementarity	Chihway Chang (Chicago)	Brenna Flaugher (Fermilab)	David Schlegel (LBNL)	
CF07	Cosmic Probes	Rana Adhikari (Caltech)	Luis Anchordoqui (CUNY)	B.S. Sathyaprakash (Penn State)	Kirsten Tollefson (MSU)



# Theory Frontier



Nathaniel Craig (UCSB)



Csaba Csaki (Cornell)



Aida El-Khadra (UIUC)

Topical Group		Topical Group co-Conveners			
TF01	String theory, quantum gravity, black holes	Daniel Harlow (MIT)	Shamit Kachru (Stanford)	Juan Maldacena (IAS)	
TF02	Effective field theory techniques	Patrick Draper (UIUC)	Ira Rothstein (CMU)		
TF03	CFT and formal QFT	David Poland (Yale)	Leonardo Rastelli (Stony Brook)		
TF04	Scattering amplitudes	Zvi Bern (UCLA)	Jaroslav Trnka (UCD)		
TF05	Lattice gauge theory	Zohreh Davoudi (UMD)	Taku Izubuchi (BNL)	Ethan Neil (UC Boulder)	
TF06	Theory techniques for precision physics	Radja Boughezal (ANL)	Zoltan Ligeti (LBNL)		
TF07	Collider phenomenology	Fabio Maltoni (Louvain / Bologna)	Shufang Su (U. Arizona)	Jesse Thaler (MIT)	
TF08	BSM model building	Patrick Fox (FNAL)	Hitoshi Murayama (UCB)		
TF09	Astro-particle physics and cosmology	Dan Green (UCSD)	Joshua Ruderman (NYU)	Ben Safdi (UM)	Jessie Shelton (UIUC)
TF10	Quantum information science	Simon Catterall (Syracuse)	Roni Harnik (FNAL)	Veronika Hubeny (UCD)	

# Accelerator Frontier



Steve Gourlay (LBNL)



Tor Raubenheimer (SLAC)



Vladimir Shiltsev (FNAL)

Topical Group		Topical Group co-Conveners			
AF01	Beam Phys & Acc. Education	Mei Bei (GSI)	Zhirong Huang (SLAC/Stanford)	Steve Lund (MSU)	
AF02	Accelerators for Neutrinos	John Galambos (ORNL)	Bob Zwaska (FNAL)	Gianluigi Arduini (CERN)	
AF03	Accelerators for EW/Higgs	Georg Hoffstaetter (Cornell)	Qing Qin (IHEP, Beijing)	Marc Ross (SLAC)	
AF04	Multi-TeV Colliders	Mark Palmer (BNL)	Nadia Pastrone (INFN, Torino)	Alexander Valishev (FNAL)	
AF05	Accelerators for PBC & Rare Processes	Mike Lamont (CERN)	Richard Milner (MIT)	Eric Prebys (UC Davis)	
AF06	Advanced Accel. Concepts	Ralph Assmann (DESY)	Cameron Geddes (LBNL)	Mark Hogan (SLAC)	Pietro Musumeci (UCLA)
AF07	Accelerator Technology R&D				
	RF	Emilio Nanny (SLAC)	Sam Posen (FNAL)	Hans Weise (DESY)	
	Magnets	Susana I. Bermudez (CERN)	Gianluca Sabbi (LBNL)	Sasha Zlobin (FNAL)	
	Targets/Sources	Charlotte Barbier (ORNL)	Frederique Pellemoine (MSU/FNAL)	Yin-E Sun (ANL)	

# Instrumentation Frontier



Phil Barbeau (Duke)



Petra Merkel (FNAL)



Jinlong Zhang (ANL)

Topical Group		Topical Group co-Conveners			
IF01	Quantum Sensors	Thomas Cecil (ANL),	Kent Irwin (SLAC)	Reina Maruyama (Yale)	Matt Pyle (Berkeley)
IF02	Photon Detectors	Juan Estrada (FNAL)	Mayly Sanchez (ISU)	Abigail Vieregge (U.Chicago)	
IF03	Solid State Detectors & Tracking	Tony Affolder (UCSC)	Artur Apresyan (FNAL)	Lucie Linssen (CERN)	
IF04	Trigger and DAQ	Darin Acosta (Florida)	Wes Ketchum (FNAL)	Stephanie Majewski (Oregon)	
IF05	Micro Pattern Gas Detectors	Bernd Surrow (Temple)	Maxim Titov (SACLAY)	Sven Vahsen (Hawaii)	
IF06	Calorimetry	Andy White (UTA)	Minfang Yeh (BNL)	Rachel Yohay (FSU)	
IF07	Electronics/ASICS	Gabriella Carini (BNL)	Mitch Newcomer (UPenn)	John Parsons (Columbia)	
IF08	Noble Elements	Eric Dahl (Northwestern)	Roxanne Guenette (Harvard)	Jen Raaf (FNAL)	
IF09	Cross Cutting and System Integration	Jim Fast (PNNL)	Maurice Garcia-Sciveres (LBL)	Ian Shipsey (Oxford)	

# Computational Frontier



Steven Gottlieb (Indiana U)



Ben Nachman (LBNL)



Oliver Gutsche (FNAL)

Topical Group		Topical Group co-Conveners		
CompF01	Experimental Algorithm Parallelization	Guiseppe Cerati (FNAL)	Katrin Heitmann (ANL)	Walter Hopkins (ANL)
CompF02	Theoretical Calculations and Simulation	Peter Boyle (BNL)	Daniel Elvira (FNAL)	Ji Qiang (LBNL)
CompF03	Machine Learning	Phiala Shanahan (MIT)	Kazu Terao (SLAC)	Daniel Whiteson (Irvine)
CompF04	Storage and processing resource access (Facility and Infrastructure R&D)	Wahid Bhimji (NERSC)	Rob Gardner (U Chicago)	Frank Würthwein (UCSD)
CompF05	End user analysis	Gavin Davies (U.Mississippi)	Peter Onyisi (UT Austin)	Amy Roberts (UC Denver)
CompF06	Quantum computing	Travis Humble (ORNL)	Gabriel Perdue (FNAL)	Martin Savage (U Washington)
CompF07	Reinterpretation and long-term preservation of data and code	Kyle Cramner (NYU)	Mike Hildreth (U Notre Dame)	Matias Carrasco Kind (Illinois/ NCSA)

# Underground Facilities and Infrastructure Frontier



Laura Baudis (U. Zurich)



Jeter Hall (SNOLAB)



Kevin Lesko (LBNL)



John Orrell (PNNL)

Topical Group		Topical Group co-Conveners			
UF01	Underground Facilities for Neutrinos	Tim Bolton	Patrick Decowski	TBD	
UF02	Underground Facilities for Cosmic Frontier	Kaixuan Ni	Emilija Pantic		
UF03	Underground Detectors	TBD	TBD		
UF04	Supporting Capabilities	Richard Schnee	Alvine Kamaha	Brianna Mount	
UF05	Synergistic Research	Daniel Robertson	TBD	TBD	
UF06	An Integrated Strategy for Underground Facilities and Infrastructure	Laura Baudis	Jeter Hall	Kevin Lesko	John Orrell

# Community Engagement Frontier



Kétévi A. Assamagan (BNL)



Breese Quinn (Mississippi)

Topical Group		Topical Group co-Conveners			
Comm01	Applications & Industry	Farah Fahim (FNAL)	Alex Murokh (RadiaBeam Technologies)	Koji Yoshimura (Okayama)	
Comm02	Career Pipeline & Development	Sudhir Malik (UPRM)	Yangyang Chen (Cornell)	Amr El Zant (BUE)	
Comm03	Diversity & Inclusion	Mu-Chun Chen (UCI)	Sam Meehan (CERN)	Carla Bonifazi (UFRJ)	
Comm04	Physics Education	Randy Ruchti (Notre Dame)	Frossie Economou (LSST)	Sijbrand de Jong (Radboud)	
Comm05	Public Education & Outreach	Sarah Demers (Yale)	Kathryn Jepsen (SLAC)	Don Lincoln (FNAL/Notre Dame)	A. Muronga (Nelson Mandela)
Comm06	Public Policy & Government Engagement	Rob Fine (Rochester)	Louise Suter (FNAL)	Brajesh Choudhary (Delhi)	